How strong is the link between the distribution of sand eels and harbour porpoises in the north-eastern German Bight?

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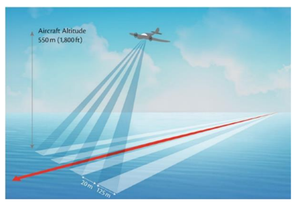
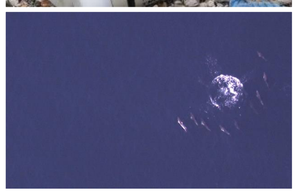
Methods:

- Absolute porpoise densities derived by digital aerial surveys (DAISI) from July to September, 2015 to 2018 (study area: 3,300 km²).
- Detection rates of porpoise clicks derived by C-PODs at 12 different positions from July to September, 2015 to 2018.
- Sand eel (Ammodytidae: *Ammodytes marinus*, *Ammodytes tobianus* & *Hyperoplus lanceolatus*) and Gobiidae (*Pomatoschistus* sp.) abundance at specific sampling points during ICES North Sea International Bottom Trawl Surveys from July to September, 2010 to 2019.

  ➢ Modelled sand eel distribution was correlated with local porpoise density and detection rates by means of Pearson's correlation score at the sampling locations. Significance of relation was assessed by means of GLM.





Results

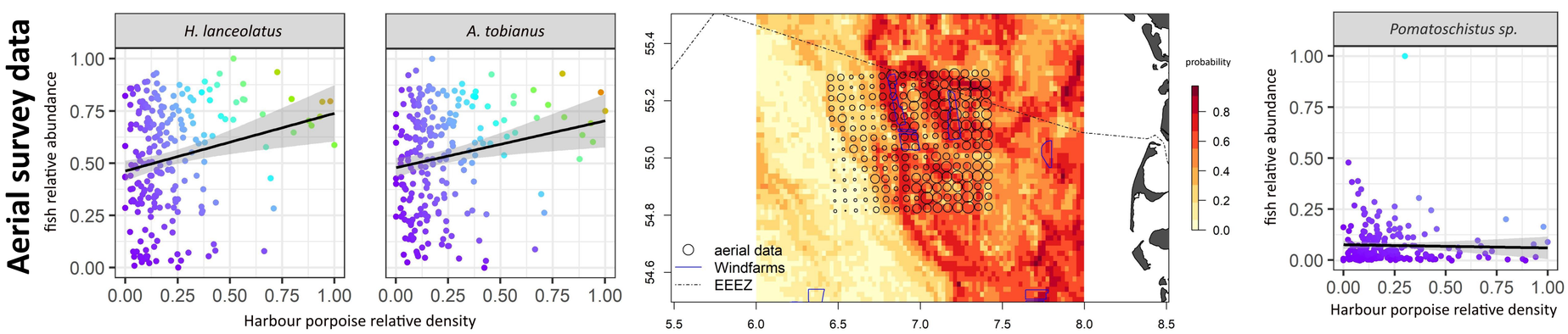


Fig 1: Correlation of *H. lanceolatus* and *A. tobianus* probability, and harbour porpoise density.

Fig 2: Harbour porpoise density (circles in 4x4 km grid; size symbolizes density) in relation to the distribution of *H. lanceolatus* indicated as probability.

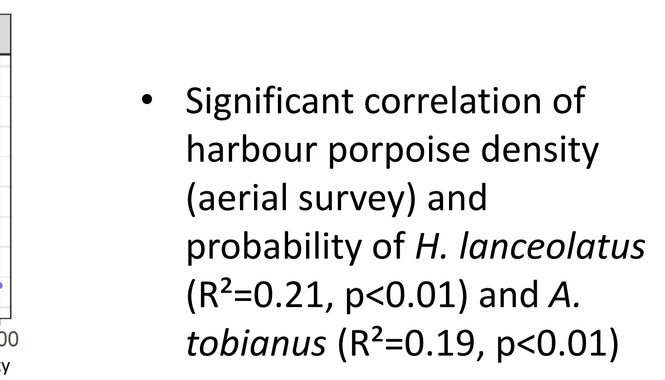


Fig 3: Correlation of *Pomatoschistus* sp. probability, and harbour porpoise density.

- Significant correlation of harbour porpoise density (aerial survey) and probability of *H. lanceolatus* (R^2=0.21, p<0.01) and *A. tobianus* (R^2=0.19, p<0.01)

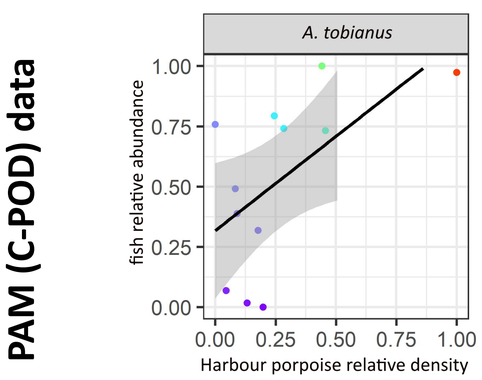


Fig 4: Correlation of *A. tobianus* probability, and harbour porpoise detection rates.

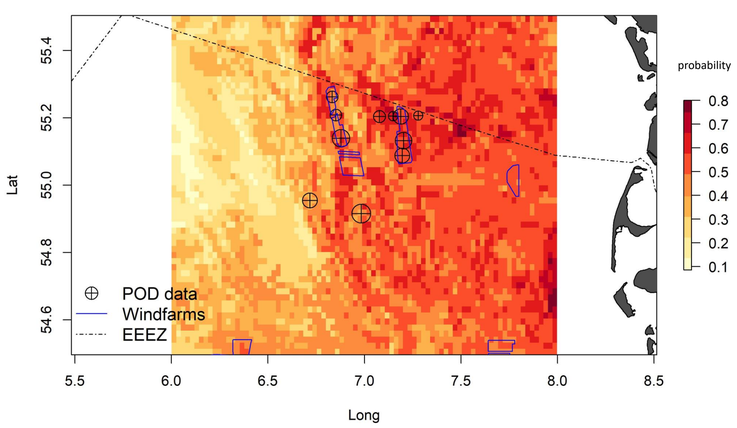


Fig 5: Harbour porpoise detection rates (circle size Symbolizes detection rate) in relation to the distribution of *A. tobianus* indicated as probability.

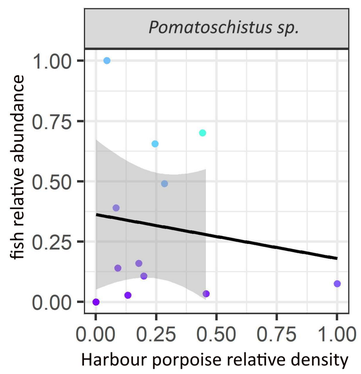


Fig 6: Correlation of *Pomatoschistus* sp. probability, and harbour porpoise detection rates.

- Significant correlation of harbour porpoise detection rates (PAM) and probability of *A. tobianus* (R^2=0.59, p<0.05)
- No correlation of harbour porpoise density and probability of *Pomatoschistus* sp.

Conclusions:

- Significant correlation of sand eel (Ammodytidae) with porpoise densities + high porpoise detection rates.
- No correlation of Gobiidae with harbour porpoise.
- Still, a large variation remains in the data.

→ **Food availability is a relevant predictor of the spatial distribution of porpoise which should be included in species distribution assessments.**

→ **More high-resolution fish data are needed to more reliably assess the link of food data to the distribution of harbour porpoise.**

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